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EXAMINER	
STEELE, AMBER D	

ART UNIT	PAPER NUMBER
1639	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/803,653	MCCAFFERTY ET AL.	
	Examiner	Art Unit	
	Amber D. Steele	1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10 pages*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 26, 2007 has been entered.

Status of the Claims

2. The amendment to the claims received on February 21, 2007 amended claim 1.

The amendment to the claims received on October 26, 2007 amended claim 1.

Claims 1-5 are currently pending and under consideration.

Priority

3. The present application claims status as a DIV of 09/726,219 filed November 28, 2000 (now U.S. Patent 6,806,079) which is a CON of 08/484,893 filed June 7, 1995 (now U.S. Patent 6,172,197) which is a CON of 07/971,857 filed January 8, 1993 (now U.S. Patent 5,969,108) which is 35 USC § 371 (national stage) application of PCT/GB92/00883 filed July 19, 1991. The present application also claims foreign priority to UK 9104744.9 filed March 6, 1991, UK 9110549.4 filed May 15, 1991, UK 9015198.6 filed July 10, 1990, UK 9022845.3 filed October 19, 1990, and UK 9024503.6 filed November 12, 1990. Please note: a request to change the Bib. Data Sheet was submitted on March 27, 2007 to move PCT/GB92/00883 from the Foreign Applications section to the Continuing Data section of the Bib. Data Sheet. However, despite the information on the front of U.S. Patent 5,969,108 (i.e. national stage of PCT/GB92/00883), U.S.

Patent 5,969,108 is not listed in the current USPTO records as a 35 USC § 371 (national stage) of PCT/GB92/00883. Another request to change the Bib. Data Sheet has been submitted.

Information Disclosure Statement

4. The information disclosure statement (IDS) submitted on March 18, 2004 is being considered in part by the examiner (see below). Please note: the references which were previously considered are crossed out with a notation of "previously considered" (i.e. prev. cons, prev. con.).

5. The information disclosure statement filed March 18, 2004 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. A copy of EP 2 137 631 (B2); WO 92/18619 (B17); De la Cruz et al. (C33), Dildrop et al. (C34), and Kabat et al. (C60) were not provided.

6. The information disclosure statement filed March 18, 2004 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered. Please refer to EP 0 324 162 (B6).

Invention as Claimed

7. A method for producing a binding molecule specific for a particular target, which method comprises the steps of: (a) producing a population of filamentous bacteriophage particles displaying at their surface a population of binding molecules having a range of binding specificities, wherein each binding molecule in the population of binding molecules has a binding domain able to bind a target and the population of binding molecules has a range of binding specificities, and wherein each filamentous bacteriophage particle contains a phagemid genome further comprising nucleic acid with a nucleotide sequence encoding the binding molecule expressed from the nucleic acid and displayed by the particle at its surface, wherein the only nucleotide sequences derived from filamentous bacteriophage in the phagemid genome are an origin of replication and a nucleotide sequence encoding a gene III capsid protein and wherein a helper phage, or a plasmid expressing complementing phage genes, is used to package said phagemid genome within each filamentous bacteriophage particle; (b) selecting for a filamentous bacteriophage particle displaying a binding molecule with a desired specificity by contacting the population of filamentous bacteriophage particles with a target so that individual binding molecules displayed on filamentous bacteriophage particles with the desired specificity bind to said target and variations thereof.

Claim Objections

8. Claims 1-5 are objected to because of the following informalities:

A. Claim 1 reads "a population of binding molecules having a range of binding specificities, wherein each binding molecule in the population of binding molecules has a binding domain able to bind a target and the population of binding molecules has a range of

binding specificities" which is considered redundant (see lines 4-6). "[A] population of binding molecules having a range of binding specificities, wherein each binding molecule in the population of binding molecules has a binding domain able to bind a target" is suggested.

B. Claim 1 reads "nucleic acid with a nucleotide sequence encoding the binding molecule expressed from the nucleic acid and displayed by the particle at its surface" which is considered redundant (see lines 8-9). "[N]ucleic acid with a nucleotide sequence encoding the binding molecule which is displayed at the particle surface" is suggested.

Appropriate correction is required.

Maintained Rejection

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. The rejection may have been altered to reflect the claim amendments received on October 26, 2007.

Claim Rejections - 35 USC § 102

10. Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Ladner et al. U.S. Patent 5,223,409 earliest potential effective filing date of September 2, 1988 alone or as evidenced by the Promega Technical Bulletins for pGEM®-3Zf(-) and pGEM®-3Zf(+) and/or the Stratagene Instruction Manual for pBluescript® II phagemid vectors regarding the nucleic acids derived from filamentous bacteriophage contained within the vectors.

For present claim 1, Ladner et al. teach methods of displaying binding proteins on the surface of filamentous bacteriophage via nucleic acid sequences including gIII and screening for target molecule binding wherein phagemids and helper phage may be utilized (please refer to entire document particularly abstract; columns 1, 4-12, 15-105; Examples I-XVI; claims 1-66).

Ladner et al. teach phagemid vectors particularly phagemid vectors pBluescript® K/S and pGEM®-3Zf (i.e. only ori from filamentous bacteriophage; please refer to column 76; lines 55-67; column 77, lines 1-4; column 106) wherein the construct comprising gIII-binding domain would be inserted into the multiple cloning site for phage display (i.e. plasmid would then contain only ori and gIII of filamentous bacteriophage; please refer to columns 53-59, section IV.B)

For present claim 2, Ladner et al. teach separating bacteriophage expressing binding proteins form the target molecules (please refer to entire document particularly columns 10-12, 93-98).

For present claim 3, Ladner et al. teach recovering of separated bacteriophage (please refer to entire document particularly columns 10-12, 98-99).

For present claim 4, Ladner et al. teach expressing the binding protein in another expression system including bacterial cells, spores, and artificial methods, etc. (please refer to entire document particularly columns 8, 10, 50-77).

For present claim 5, Ladner et al. teach utilizing the methods to express antibodies including the Fc portion (please refer to entire document particularly columns 15-16).

Therefore, the presently claimed invention is anticipated by the teachings of Ladner et al.

Arguments and Response

11. Applicants' arguments directed to the rejection under 35 USC 102 (e) as being anticipated by Ladner et al. for claims 1-5 were considered but are not persuasive for the following reasons.

Applicants contend that Ladner et al. does not teach a phagemid which only comprises filamentous bacteriophage derived nucleic acids of the ori and gene III. In addition, applicants contend that Ladner et al. teach against the use of phagemids lacking a full phage genome and prefer utilizing pGem vectors which have the full phage genome (see column 76, lines 55-67; Example 1; column 106, lines 5-10, 34-39, and 54-58; column 11, lines 15-40 of Ladner et al.).

Applicants' arguments are not convincing since the teachings of Ladner et al. anticipate the method of the instant claims. Ladner et al. teach phagemid vectors particularly phagemid vectors pBluescript® K/S and pGEM®-3Zf (i.e. only ori from filamentous bacteriophage; please refer to column 76; lines 55-67; column 77, lines 1-4; column 106) wherein the construct comprising gIII-binding domain would be inserted into the multiple cloning site for phage display (i.e. plasmid would then contain only ori and gIII of filamentous bacteriophage; please refer to columns 53-59, section IV.B). In addition, Ladner et al. specifically state that while certain phagemids are not preferred for their purposes (i.e. controlling mutations via random mutagenesis of a limited number of predetermined codons; please refer to column 1, lines 40-52) because coinfections could lead to genetic recombination (i.e. non-controlled mutation), phagemids are suitable for developing a gene that causes a binding domain to appear on the surface of phage-like genetic packages (please refer to the paragraph spanning columns 76 and 77). Thus, if controlled mutagenesis is not contemplated (i.e. presently claimed method), a phagemid vector would be suitable for phage display of binding domains.

New Rejection

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

13. Claims 1-3 and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Bass et al. U.S. Patent 5,688,666 (effective filing date of October 28, 1988; provided in IDS submitted March 18, 2004).

For present claim 1, Bass et al. teach methods for selecting novel proteins (i.e. growth hormone variants) having altered binding properties comprising producing a library (i.e. population) of filamentous bacteriophage (i.e. M13) surface displaying a library (i.e. population) of growth hormone (GH) variants or other mammalian proteins including antibodies (i.e. binding molecules having a range of binding specificities) wherein each filamentous bacteriophage contains a phagemid comprising nucleic acid encoding the GH variants and only nucleic acid sequences derived from filamentous bacteriophage consisting of ori (i.e. f1 ori) and gene III wherein a helper phage is utilized to package the phagemid, contacting the filamentous bacteriophage surface displaying the GH variants with ligands/targets, and selecting for binding (please refer to the entire specification particularly the abstract; Figures 1, 3, 5-9; column 4, lines 64-67; columns 5-17).

For present claim 2, Bass et al. teach separation of bound phage from the ligands/targets (i.e. dissociation; please refer to the entire specification particularly column 17, lines 35-54).

For present claim 3, Bass et al. teach recovering phage with the desired binding specificity (please refer to the entire specification particularly column 5, method step g, lines 19-20; column 17, lines 35-54).

For present claim 5, Bass et al. teach antibodies (i.e. Fc tail; please refer to the entire specification particularly column 5, lines 40-67; column 10, lines 5-50).

Therefore, the presently claimed invention is anticipated by the teachings of Bass et al.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bass et al. U.S. Patent 5,688,666 (effective filing date of October 28, 1988; provided in IDS submitted March 18, 2004) and Cunningham et al. U.S. Patent 5,534,617 (effective filing date of October 28, 1988).

For present claim 1, Bass et al. teach methods for selecting novel proteins (i.e. growth hormone variants) having altered binding properties comprising producing a library (i.e. population) of filamentous bacteriophage (i.e. M13) surface displaying a library (i.e. population) of growth hormone (GH) variants or other mammalian proteins including antibodies (i.e. binding molecules having a range of binding specificities) wherein each filamentous bacteriophage

contains a phagemid comprising nucleic acid encoding the GH variants and only nucleic acid sequences derived from filamentous bacteriophage consisting of ori (i.e. f1 ori) and gene III wherein a helper phage is utilized to package the phagemid, contacting the filamentous bacteriophage surface displaying the GH variants with ligands/targets, and selecting for binding (please refer to the entire specification particularly the abstract; Figures 1, 3, 5-9; column 4, lines 64-67; columns 5-17).

For present claim 2, Bass et al. teach separation of bound phage from the ligands/targets (i.e. dissociation; please refer to the entire specification particularly column 17, lines 35-54).

For present claim 3, Bass et al. teach recovering phage with the desired binding specificity (please refer to the entire specification particularly column 5, method step g, lines 19-20; column 17, lines 35-54).

For present claim 5, Bass et al. teach antibodies (i.e. Fc tail; please refer to the entire specification particularly column 5, lines 40-67; column 10, lines 5-50).

However, Bass et al. does not teach recombinantly expressing the binding molecule separate from the filamentous bacteriophage particles.

For present claim 4, Cunningham et al. teach methods of phage displaying hGH variants via phagemid and helper phage wherein the hGH variants are screened and selected for binding to ligands/targets wherein the recovered hGH variants can be cloned and expressed in non-phage (i.e. non-phagemid) expression vectors (please refer to the entire specification particularly columns 5 and 12-20 especially column 13, lines 51-64; Example II).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the method of phage displaying mammalian proteins taught by

Bass et al. with the further expression of the mammalian proteins via an expression vector as taught by Cunningham et al.

One having ordinary skill in the art would have been motivated to do this because Cunningham et al. teach that an expression vector can be utilized for amplification (i.e. production of the selected protein in higher quantities; please refer to column 13, lines 51-64).

One of ordinary skill in the art would have had a reasonable expectation of success in the modification of the method of phage displaying mammalian proteins taught by Bass et al. with the further expression of the mammalian proteins via an expression vector as taught by Cunningham et al. because of the disclosure by Cunningham et al. utilizing expression vectors to express proteins (please refer to column 4, lines 13-15; column 8, lines 45-67; columns 9-10; column 13, lines 51-64).

Therefore, the modification of the method of phage displaying mammalian proteins taught by Bass et al. with the further expression of the mammalian proteins via an expression vector as taught by Cunningham et al. render the instant claims *prima facie* obvious.

Future Communications

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amber D. Steele whose telephone number is 571-272-5538. The examiner can normally be reached on Monday through Friday 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doug Schultz can be reached on 571-272-0763. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Amber D. Steele/
Patent Examiner
AU1639

January 11, 2008